MEMORANDUM FOR THE CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Terms of Reference – Defense Science Board (DSB) Task Force on the National Nuclear Security Administration (NNSA) Strategic Plan for Advanced Computing

The DSB shall conduct an evaluation of the strategic plan for advanced computing of the NNSA and assess the impact of using the planned capability for other National Security issues.

Advanced computing capabilities have long supported a wide range of National Defense issues. In addition to traditional uses, advances in supercomputing capability are creating exciting new opportunities in basic scientific research that can be employed to generate breakthroughs for national security applications. Furthermore, the increasing complexity and the large span of issues is driving the development of validated tools that help address and solve time-urgent issues by developing new and/or unique national security mission capabilities. These validated tools can only be derived from advanced computing capabilities.

The NNSA employs advanced computing capabilities for a specific capability. Under the auspices of the Advanced Simulation and Computing (ASC) program, NNSA addresses nuclear weapons stockpile and national security issues through the development and use of computer simulations. The ASC integrated codes incorporate high-fidelity scientific models validated against experimental results and compared to theory. The mission of the ASC program is to fulfill the science-based simulation requirements of the Stockpile Stewardship Program, which underpins NNSA efforts to certify the safety, performance, and reliability of nuclear weapons.

Problems include: advanced design and manufacturing processes; understanding accident scenarios; nuclear weapons aging; and the resolution of concerns that arise when older weapons are opened up and inspected. The complexity of the physics associated with nuclear weapons science has driven the need for state-of-the-art computer capabilities. Consequently, for the past half-century, some of the world's fastest computers typically resided at the weapons laboratories.

The Task Force should conduct an evaluation that shall include the following:

(1) An assessment of:

(A) the adequacy of the strategic plan in supporting the Stockpile Stewardship Program;

(B) the role of research into, and development of, high-performance computing supported by the NNSA in fulfilling the mission of the NNSA and in maintaining the leadership of the United States in high-performance computing;

(C) the impacts of changes in investment levels or research and development strategies on fulfilling the missions of the NNSA; and

(D) the importance of the NNSA and partner agencies using current and projected scientific computing capabilities to address a broad spectrum of national security challenges, including threats to citizens and to the Nation's infrastructure.

(2) An assessment of the efforts of the Department of Energy to:

(A) coordinate high-performance computing work within the Department of Energy, in particular between the NNSA and the Office of Science;

(B) develop joint strategies with other Federal agencies and private industry groups for the development of high-performance computing; and

(C) share high-performance computing developments with private industry and capitalize on innovations in private industry in high-performance computing.

The Task Force shall have access to all levels of classified information needed to develop its assessment and recommendations. A report shall be submitted to the Secretary of Energy and Secretary of Defense with sufficient lead time to meet the legislative deadline for the report to Congress.

The Study will be sponsored by me as the Under Secretary of Defense for Acquisition, Technology and Logistics; the Administrator, National Nuclear Security Administration; and the Acting Assistant to the Secretary for Nuclear, Chemical and Biological Programs. Mr. Bob Nesbit and Dr. Bruce Tartar will serve as the Task Force co-Chairmen. Ms. Jacqueline Bell, Defense Threat Reduction Agency, and Dr. Dimitri Kusnezov, NNSA, will serve as the co-Executive Secretaries. Major Charles Lominac, USAF, will serve as the DSB Military Assistant.

The Task Force will operate in accordance with the provisions of P.L. 92-463, the "Federal Advisory Committee Act," and DoD Directive 5105.4, the "DoD Federal Advisory Committee Management Program." It is not anticipated that this Task Force will need to go into any "particular matters" within the meaning of title 18, United States Code, Section 208, nor will it cause any member to be placed in the position of action as a procurement official.

Date 4/3/2008

Thomas P. D'Agostino
Administrator
National Nuclear Security Administration

Date 4/8/08

John J. Young, Jr.
Under Secretary of Defense
for Acquisition, Technology and Logistics